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INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 7 : C11D 3/22, 11/00 — A1

(11) International Publication Number: WO 00/42143

(43) International Publication Date: 20 July 2000 (20.07.00)

(21) International Application Number: PCT/EP99/09054

(22) International Filing Date: 24 November 1999 (24.11.99)

(30) Priority Data:
9900957.3 15 January 1999 (15.01.99) GB

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(81) Designated States: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

Published
With international search report.

(54) Title: DETERGENT COMPOSITION

(57) Abstract

A detergent composition suitable for cleaning laundry or hard surfaces comprising up to 50 wt.% of the total detergent composition of detergent active and gum ghatti, a gum of the water swellable, branched hydrocolloids obtained from the species belonging to the genera *Anogeissus*.

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Detergent Composition

Technical field

The invention relates to a detergent composition for washing fabric or hard surfaces. More particularly the invention relates to compositions for cleaning hard surfaces and for manual dishwashing.

Background of the Invention

It is well known that foam volume and foam stability are often used by the consumer to gauge the cleaning efficiency. This is particularly the case when manual cleaning of fabrics and dishes occurs. It is therefore commercially desirable to formulate a detergent composition with improved foaming performance.

Commercial hard surface cleaning compositions typically comprise one or more surfactants and a plurality of abrasives dispersed in. Combinations of these together with electrolytes are generally used to form a structuring system as is well known in the art.

In the past gums have been incorporated into liquid detergent formulations mainly as viscosity modifiers, as foam stabilisers and to improve product stability.

It has been found that the viscosity of liquid products can be increased by the inclusion of low levels of water-soluble polymers and that the presence of these polymers gives enhanced foaming and detergency.

The term Gum as technically employed in industry, refers to plant or microbial polysaccharides or their derivatives that are dispersible in either cold or hot water to produce viscous mixtures or solutions. In general, gums are hydrophobic or hydrophilic high molecular weight molecules, usually with colloidal properties.

EP 124367 (Unilever) discloses the use of selected polymers and Xanthum gum to enhance the foam stability and viscosity of liquid detergents based on dialkyl sulphosuccinates.

Xanthum gum is disclosed as a thickening agent in hard surface cleaners in EP 839907 (Procter and Gamble).

The present invention provides a detergent composition that has enhanced foam production, better foam stability and improved detergency.

Description of the Invention

According to the preferred aspect of the invention there is provided a detergent composition suitable for cleaning laundry or hard surfaces comprising up to 50%wt. of the total detergent composition of detergent active component of gum Ghatti, a gum of the water swellable, branched

hydrocolloids obtained from the species belonging to the genera *Anogeissus*.

According to another aspect of the invention provides a process for the preparation of the detergent composition as claimed in any of the preceding claims comprising the steps of neutralising the active detergent where possible and addition of gum ghatti as an aqueous dispersion to the active detergent.

Detailed Description of the Invention

The compositions of the present invention contain as essential components gum ghatti and a detergent. These compositions provide improved cleaning of dishes and laundry in the presence of water, i.e. during use and enhance the foam volume and its stability.

These compositions are of particularly useful for cleaning hard surfaces and in particular for manual dishwashing.

The term dishes as used herein means any utensils involved in food preparation or consumption which may be required to be washed to free them from food particles and other food residues, greases, proteins, starches, gums, dyes and burnt organic residues.

Gums :

The present invention contains as an essential element gum Ghatti. Gum Ghatti is derived from *Anogeissus latifolia* a large gregarious tree belonging to the family Combretaceae, commonly found in the dry deciduous forests of India and Sri Lanka. The tree yields a gum or a water swellable, branched hydrocolloid commonly known as Indian gum or *gum ghatti*, which occurs in straw coloured vermiform tears and dries without cracking.

The preferred level of gum ghatti in the total composition is from 0.05 to 10 wt% of the total composition, preferably 0.1 to 5 wt%, most preferably 0.1 to 3 wt%.

Optionally other water-soluble polymers such as hydrophilically substituted polysaccharides or gums such as commonly available vegetable gums, gum arabic, karaya gum, gellan gum, almond gum, tragacanth gum or Xanthan gum may be incorporated.

If other water-soluble polymers or gums are present it is preferable if the total level of water-soluble polymer or gum does not exceed 5 wt% of the total composition and is preferably is equal to or below 3 wt%.

Detergent Actives:

The composition according to the invention comprise a detergent actives chosen from anionic, nonionic, cationic, zwitterionic detergent actives or mixtures thereof.

It is preferable if the detergent active comprises an anionic surfactant. Suitable anionic detergent active compounds are water soluble salts of organic sulphuric reaction products having in the molecular structure an alkyl radical containing from 8 to 22 carbon atoms, and a radical chosen from sulphonic acid or sulphur acid ester radicals and mixtures thereof.

Examples of suitable anionic detergents are sodium and potassium alcohol sulphates, especially those obtained by sulphating the higher alcohols produced by reducing the glycerides of tallow or coconut oil; sodium and potassium alkyl benzene sulphonates such as those in which the alkyl group contains from 9 to 15 carbon atoms; sodium alkyl glyceryl ether sulphates, especially those ethers of the higher alcohols derived from tallow and coconut oil; sodium coconut oil fatty acid monoglyceride sulphates ; sodium and potassium salts of sulphuric acid esters of the reaction product of one mole of a higher fatty alcohol and from 1 to 6 moles of ethylene oxide ; sodium and potassium salts of alkyl phenol ethylene oxide ether sulphate with from 1 to 8 units of ethylene oxide molecule and in which the alkyl radicals contain from 4 to 14 carbon atoms; the reaction product of fatty acids esterified with isethionic acid and

neutralised with sodium hydroxide where, for example, the fatty acids are derived from coconut oil and mixtures thereof.

The preferred water-soluble synthetic anionic detergent active compounds are the alkali metal (such as sodium and potassium) and alkaline earth metal (such as calcium and magnesium) salts of higher alkyl benzene sulphonates and mixtures with olefin sulphonates and higher alkyl sulphates, and the higher fatty acid monoglyceride sulphates. The most preferred anionic detergent active compounds are higher alkyl aromatic sulphonates such as higher alkyl benzene sulphonates containing from 6 to 20 carbon atoms in the alkyl group in a straight or branched chain, particular examples of which are sodium salts of higher alkyl benzene sulphonates or of higher-alkyl toluene, xylene or phenol sulphonates, alkyl naphthalene sulphonates, ammonium diamyl naphthalene sulphonate, and sodium dinonyl naphthalene sulphonate. Particularly preferred is Sodium Alkyl Benzene Sulphonate (LAS)

Suitable nonionic detergent active compounds can be broadly described as compounds produced by the condensation of alkylene oxide groups, which are hydrophilic in nature, with an organic hydrophobic compound which may be aliphatic or alkyl aromatic in nature. The length of the hydrophilic or polyoxyalkylene radical which is condensed with any particular hydrophobic group can be readily adjusted to yield a water-soluble compound having the desired degree of balance between hydrophilic and hydrophobic elements.

Particular examples include the condensation product of aliphatic alcohols having from 8 to 22 carbon atoms in either straight or branched chain configuration with ethylene oxide, such as a coconut oil ethylene oxide condensate having from 2 to 15 moles of ethylene oxide per mole of coconut alcohol; condensates of alkylphenols whose alkyl group contains from 6 to 12 carbon atoms with 5 to 25 moles of ethylene oxide per mole of alkylphenol; condensates of the reaction product of ethylenediamine and propylene oxide with ethylene oxide, the condensate containing from 40 to 80% of polyoxyethylene radicals by weight and having a molecular weight of from 5,000 to 11,000; tertiary amine oxides of structure R_3NO, where one group R is an alkyl group of 8 to 18 carbon atoms and the others are each methyl, ethyl or hydroxyethyl groups, for instance dimethyldodecylamine oxide; tertiary phosphine oxides of structure R_3PO, where one group R is an alkyl group of from 10 to 18 carbon atoms, and the others are each alkyl or hydroxyalkyl groups of 1 to 3 carbon atoms, for instance dimethyldodecylphosphine oxide; and dialkyl sulphoxides of structure R_2SO where the group R is an alkyl group of from 10 to 18 carbon atoms and the other is methyl or ethyl, for instance methyltetradecyl sulphoxide; fatty acid alkylolamides; alkylene oxide condensates of fatty acid alkylolamides and alkyl mercaptans.

Suitable amphoteric detergent-active compounds that optionally can be employed are derivatives of aliphatic secondary and tertiary amines containing an alkyl group of 8 to 18 carbon atoms and an aliphatic radical substituted by an anionic water-solubilizing group, for instance sodium 3-

dodecylamino-propionate, sodium 3-dodecylaminopropane sulphonate and sodium N-2-hydroxydodecyl-N-methyltaurate. Suitable cationic detergent-active compounds are quaternary ammonium salts having an aliphatic radical of from 8 to 18 carbon atoms, for instance cetyltrimethyl ammonium bromide.

Suitable zwitterionic detergent-active compounds that optionally can be employed are derivatives of aliphatic quaternary ammonium, sulphonium and phosphonium compounds having an aliphatic radical of from 8 to 18 carbon atoms and an aliphatic radical substituted by an anionic water-solubilising group, for instance 3-(N-N-dimethyl-N-hexadecylammonium) propane-1-sulphonate betaine, 3-(dodecylmethyl sulphonium) propane-1-sulphonate betaine and 3-(cetylmethylphosphonium) ethane sulphonate betaine.

Further examples of suitable detergent-active compounds are compounds commonly used as surface-active agents given in the well-known textbooks "Surface Active Agents", Volume I by Schwartz and Perry and "Surface Active Agents and Detergents", Volume II by Schwartz, Perry and Berch.

The total amount of detergent active compound to be employed in the detergent composition of the invention will generally be from 1.5 to 25%, preferably from 2 to 15% by weight.

Abrasives:

A particulate abrasive phase is a useful ingredient of compositions according to the present invention.

Preferably, the particulate phase comprises a particulate abrasive that is insoluble in water. In the alternative, the abrasive may be soluble and present in such excess to any water present in the composition that the solubility of the abrasive in the aqueous phase is exceeded and consequently solid abrasive exists in the composition.

Suitable abrasives can be selected from, particulate zeolites, calcites, dolomites, feldspars, silicas, silicates, other carbonates, aluminas, bicarbonates, borates, sulphates and polymeric materials such as polyethylene.

Preferred abrasives for use in general purpose compositions have Mho hardness 2-6 although higher hardness abrasives can be employed for specialist applications.

Preferred average particle sizes for the abrasive fall in the range 0.5-400 microns, with values of around 10-200 microns being preferred.

Preferred levels of abrasive range from 4-95wt % on product, more preferably in the range 20-60wt%. The physical form of the product will be influenced by the level of abrasive present.

The most preferred abrasives are calcium carbonate (as Calcite), mixtures of calcium and magnesium carbonates (as dolomite), sodium hydrogen carbonate, potassium sulphate, zeolite, alumina, hydrated alumina, feldspars, talc and silica.

Calcite, feldspar and dolomite and mixtures thereof are particularly preferred due to their low cost, suitable hardness and colour.

Builders:

Compositions of the invention may contain a detergency builder.

The detergency builders used in the formulation are preferably inorganic and suitable builders include, for example, alkali metal aluminosilicates (zeolites), sodium carbonate, sodium tripolyphosphate (STPP), tetrasodium pyrophosphate (TSPP), and combinations of these.

Typical examples of phosphorus-containing inorganic builders, when present, include the water-soluble salts, especially alkali metal pyrophosphates, orthophosphates and polyphosphates. Specific examples of inorganic phosphate builders include sodium and potassium tripolyphosphates, pyrophosphates and hexametaphosphates.

Suitable examples of non-phosphorus-containing inorganic builders, when present, include water-soluble alkali metal carbonates, bicarbonates, sesquicarbonates, borates, silicates, including layered silicates such as SKS-6 ex. Hoechst, metasilicates, and crystalline and amorphous aluminosilicates. Specific examples include sodium carbonate (with or without calcite seeds), potassium carbonate, sodium and potassium bicarbonates, silicates including layered silicates and zeolites. The preferred

sodium aluminosilicates of this type are the well-known commercially available zeolites 4A and X, maximum aluminium zeolite P (zeolite MAP) and mixtures thereof.

It is preferred for hand dish wash formulations if the builder material is, sodium tripolyphosphate (STPP)

Builders are suitably used in an amount ranging from 0.1 to 50% by wt, preferably from 0.5 to 30% by wt, most preferably from 0.5 to 10 wt%.

Fillers:

Fillers suitable for use in the formulation include kaolin, calcium carbonate (calcite), talc, soapstone, china clay and the like, used singly or in combination, suitably in an amount ranging from 10 to 75% by weight, preferably from 30 to 70 wt%.

Solvents:

Solvents suitable in the compositions of the present invention are Alkanolamines, which can be mono- or poly-functional as regards the amine and hydroxy moieties. Preferred alkanolamines are generally of the formulation H_2N-R_1-OH where R_1 is a linear or branched alkyl chain having 2-6 carbons. Particularly preferred alkanolamine especially to clean tough or aged soil is 2-amino-2-methyl-1-propanol (AMP) or monoethanol amine.

Other suitable solvents include saturated and unsaturated, linear or branched hydrocarbons, and/or materials of the general formula:

$$R_1\text{-}O\text{-}(EO)_m\text{-}(PO)_n\text{-}R_2$$

wherein R_1 and R_2 are independently C1-7 alkyl or H, but not both hydrogen, m and n are independently 0-5. Suitable glycol ethers include di-ethylene glycol mono n-butyl ether, mono-ethylene glycol mono n-butyl ether, propylene glycol n-butyl ether and mixtures thereof. Typical levels of solvent range from 1-15% wt.

Electrolyte base:

Suitable electrolyte bases include soluble carbonates and bicarbonates, although use of hydroxides and other alkaline salts is not excluded. Alkali metal carbonates are particularly preferred, with potassium carbonate being the most preferred. Typical levels of electrolytes range from 0.5-5%wt, with 1-2.5%wt being particularly preferred. The level of the electrolyte should be such that in use the pH of the composition is raised above the pKa of the alkanolamine, and preferably to a pH at least one unit above the pKa of the alkanolamine.

Rheology and Structuring Agents:

As described above the compositions of the invention be in the form of solid, liquids, pastes or gels. Other suitable rheological control agents can be present especially when

the compositions contain significant amounts of water or low viscosity surfactants.

Other Ingredients:

Other ingredients such as perfumes, colouring agents, fluoresces, enzymes and bleaches can also be used in the formulation.

Product Form:

Detergent compositions of the present may formulated in different forms such as powders, granules, bars, liquids, pastes and gels. However it is preferable if the product is in solid form that is a powder, granule, bar or paste. It is most preferable if the composition is a bar.

The invention will now be illustrated with respect to the following non-limiting examples.

Examples:

Process for preparation of the composition:

The formulations disclosed in Table 1 were prepared using conventional bar processing technology. The ingredients were mixed in a sigma mixer, extruded into bars and then cut into billets and stamped. In the experimental examples 2 to 5 the *gum ghatti* dispersed in water was incorporated.

Table 1

Composition (%wt)	Ex 1	Ex 2	Ex 3	Ex 4	Ex 5
Na LAS	7	7	7	7	7
China clay	24.1	24.1	24.1	24.1	24.1
Feldspar	29.0	29.0	29.0	29.0	29.0
Aluminium sulphate	2.0	2.0	2.0	2.0	2.0
Alkaline silicate	3.5	3.5	3.5	3.5	3.5
Soda	6.7	6.7	6.7	6.7	6.7
Calcium hydroxide	1.0	1.0	1.0	1.0	1.0
STPP	1.0	1.0	1.0	1.0	1.0
Calcite	11.0	11.0	11.0	11.0	11.0
Gum Ghatti	-	0.25	0.5	2	6.0
Minor ingredients	0.2	0.2	0.2	0.2	0.2
Water	to 100	to 100	to 100	to 100	to 100

In use properties of the bar:

a. Tough soil cleaning:

The mobile soil that has been polymerised by heating at high temperature is known as tough soil. When the soil is smeared uniformly on a stainless steel plate and heated it forms a polymerised film on the plate.

0. 2g of the product as defined in the different Examples mentioned in Table 1 were uniformly rubbed on the soiled plate and then rinsed with water. The amount of soil removed was evaluated gravametrically. The experiment was conducted with replicates and analysed statistically.

b. Lather Measurements:

0.1g of the detergent bars Examples 1 to 5 were dissolved in 20 ml water were taken in different graduated measuring cylinders. The cylinders were shaken 30 times and the volume of lather and the nature of lather were noted.

c. Cleaning of unpolymerised oily soil:

Uniform quantity of vegetable oil is spread on stainless steel plates and the number of such soiled plates that can be cleaned for a particular quantity of the product was assessed using samples according to Examples 1-5.

In all the above evaluations 2% *gum ghatti* dispersed in water was used for comparison, since at the corresponding level of dilution of the gum dispersion as done for the detergent bar, the lather, % cleaning of tough soil and number of plates cleaned are negligible or zero.

The data presented in Table 2 shows that the incorporation of gum at different levels into the detergent bar gave a very creamy lather and significant improvement in tough soil cleaning as well as increase in number of plates that could be cleaned. It was also found that the bar processability improved significantly by the incorporation of the gum into

the bar but at high levels (6%) of incorporation, the formulation became pasty and difficult to process.

Table 2

Composition	Lather Volume (ml) Characteristics		% Cleaning of tough soil	Number of plates cleaned
Example 1	97	Thin & Unstable	21.4	5
Example 2	103	Slight creamy	26.7	6
Example 3	103	Creamy	29.1	6
Example 4	102	Creamy	30.2	6
Example 5	90	Very thick	28.5	7
2% *gum ghatti* dispersion	5	Creamy	3.4	0

Comparison Of *gum ghatti* with *gum Arabic*:

Detergent bars were prepared according to Example 1, Example 3 and in Example 6 the 0.5% of *gum arabic* was incorporated in place of *gum ghatti*. These samples were tested by the procedure described above for lather measurement, tough soil cleaning and the cleaning of unpolymerised soil. The data presented in Table 3 shows that *gum ghatti* was significantly superior to *gum Arabic* in lather volume and tough soil cleaning. In addition, the processability of the bar with *gum ghatti* was significantly superior to *gum Arabic*.

Table 3

Composition	Lather Volume (ml) Characteristics		% cleaning of tough soil	Number of plates cleaned
Example 1	97	Thin & Unstable	21.4	5
Example 3	103	Creamy	29.1	6
Example 6	86	Creamy	28.3	6

It is thus possible to obtain a synergistic detergent composition by incorporating the gum or the water swellable, branched hydrocolloids obtained from the species belonging to the genera *Anogeissus*.

CLAIMS

1. A detergent composition suitable for cleaning laundry or hard surfaces comprising up to 50%wt. of the total detergent composition of detergent active and gum ghatti, a gum of the water swellable, branched hydrocolloids obtained from the species belonging to the genera *Anogeissus*.

2. A detergent composition according to claim 1 in which the level of gum ghatti is from 0.1 to 5 wt% of the total composition.

3. A detergent composition according to claim 1 or claim 2 in which the composition further comprises a particulate abrasive.

4. A detergent composition according to claim 3 in which the level of particulate abrasive is from 20 to 60 wt% of the total composition.

5. A detergent composition according to claim 3 or claim 4 in which the particulate abrasive is selected from calcite, feldspar, dolomite or mixtures thereof.

6. A detergent composition according to any preceding claim in which the detergent active is an anionic surfactant.

7. A detergent composition according to any preceding claim in which the detergent active is sodium alkyl benzene sulphonate

8. A detergent composition according to any preceding claim in which the total level of detergent active is from 1.5 to 25 wt%.

9. A detergent composition according to any preceding claim which further comprises a detergency builder.

10. A process for the preparation of the detergent composition as claimed in any of the preceding claims comprising the steps of neutralising the active detergent where possible and addition of gum ghatti as an aqueous dispersion to the active detergent.

INTERNATIONAL SEARCH REPORT

Inte onal Application No
PCT/EP 99/09054

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 C11D3/22 C11D11/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 C11D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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A	abstract	2
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[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
13 March 2000	23/03/2000

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

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P,X	US 5 942 478 A (LOPES JOHN A) 24 August 1999 (1999-08-24) claims 1,8,16	1,7-9
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Information on patent family members

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